

WHAT IS CLAIMED IS:

1. A drop generator comprising:  
a pressure chamber;  
an inlet channel connected to the pressure chamber;  
an outlet channel connected to the pressure chamber, the outlet channel having an outlet channel axis;  
a drop emitting nozzle disposed at an end of the outlet channel; and  
the outlet channel including a circular outlet channel section and a non-circular outlet channel section.
2. The drop generator of claim 1 further including a piezoelectric element.
3. The drop generator of claim 1 wherein the inlet channel receives melted solid ink.
4. The drop generator of claim 1 wherein the circular section is connected to the ink pressure chamber.
5. The drop generator of claim 1 wherein the circular section is connected to the ink pressure chamber and wherein the non-circular section is connected to the circular section.
6. The drop generator of claim 1 wherein the circular section includes a first circular sub-section and a second circular sub-section.
7. The drop generator of claim 1 wherein the non-circular section has an oval cross-section.

8. The drop generator of claim 1 wherein the non-circular section has a generally egg-shaped cross-section.

9. The drop generator of claim 1 wherein the non-circular section has a generally egg-shaped cross-section, and wherein the nozzle is disposed at a smaller end of the egg-shaped cross-section.

10. The drop generator of claim 1 wherein the nozzle is disposed at an end of the non-circular section.

11. The drop generator of claim 1 wherein the ink pressure chamber has a cross-section that is generally parallelogram shaped.

12. The drop generator of claim 1 wherein the nozzle emits drops having a mass in the range of about 20 nanograms to about 30 nanograms.

13. The drop generator of claim 1 wherein the pressure chamber is operated at a frequency of about 23 KHz to about 30 KHz.

14. A drop generator comprising:  
a pressure chamber;  
an inlet channel connected to the pressure chamber;  
an outlet channel connected to the pressure chamber;  
the outlet channel including a first circular outlet channel section connected to the pressure chamber, a first non-circular outlet channel section connected to the first circular outlet channel section, a second circular outlet channel section connected to the first non-circular outlet channel section, and a second non-circular outlet channel section connected to the second circular outlet section; and

a drop emitting nozzle disposed at an end of the second non-circular outlet channel.

15. The drop generator of claim 14 further including a piezoelectric element.

16. The drop generator of claim 14 wherein the inlet channel receives melted solid ink.

17. The drop generator of claim 14 wherein at least one of the first circular section and the second circular section includes a first circular sub-section and a second circular sub-section.

18. The drop generator of claim 14 wherein the first non-circular section has an oval cross-section.

19. The drop generator of claim 14 wherein the non-circular section has a generally egg-shaped cross-section.

20. The drop generator of claim 14 wherein the non-circular section has a generally egg-shaped cross-section, and wherein the nozzle is disposed at a smaller end of the egg-shaped cross-section.

21. The drop generator of claim 14 wherein the nozzle is disposed at an end of the non-circular section.

22. The drop generator of claim 14 wherein the ink pressure chamber has a cross-section that is generally parallelogram shaped.

23. The drop generator of claim 14 wherein the nozzle emits drops having a mass in the range of about 20 nanograms to about 30 nanograms.

24. The drop generator of claim 14 wherein the pressure chamber is operated at a frequency of about 23 KHz to about 30 KHz.

25. The drop generator of claim 14 wherein the outlet channel has a length in the range of about 59/1000 inches to about 79/1000 inches.

26. The drop generator of claim 14 wherein the outlet channel has a length in the range of about 69/1000 inches to about 77/1000 inches.

27. The drop generator of claim 14 wherein the first circular outlet channel section has a length that is less than about 20/1000 inches.

28. The drop generator of claim 14 wherein the first circular outlet channel section has a length in range of about 11/1000 inches to about 13/1000 inches.

29. The drop generator of claim 14 wherein the second circular outlet channel section has a length that is less than about 40/1000 inches.

30. The drop generator of claim 14 wherein the second circular outlet channel section has a length in the range of about 24/1000 inches to about 26/1000 inches.

31. The drop generator of claim 14 wherein the first circular outlet channel section has an average diameter in the range of about 10/1000 inches to about 20/1000 inches.

32. The drop generator of claim 14 wherein the first circular outlet channel section has an average diameter in the range of about  $11/1000$  inches to about  $13/1000$  inches.

33. The drop generator of claim 14 wherein the second circular outlet channel section has an average diameter in the range of about  $8/1000$  inches to about  $15/1000$  inches.

34. The drop generator of claim 14 wherein the second circular outlet channel section has an average diameter in the range of about  $12/1000$  inches to about  $14/1000$  inches.

35. The drop generator of claim 14 wherein the first non-circular outlet channel section has a length that is less than about  $40/1000$  inches.

36. The drop generator of claim 14 wherein the first non-circular outlet channel section has a length in the range of about  $27/1000$  inches to about  $29/1000$  inches.

37. The drop generator of claim 14 wherein the second non-circular outlet channel section has a length in the range of about  $4/1000$  inches to about  $10/1000$  inches.

38. The drop generator of claim 14 wherein the second non-circular outlet channel section has a length in the range of about  $7/1000$  inches to about  $9/1000$  inches.

39. The drop generator of claim 14 wherein the first non-circular outlet channel section has an effective diameter of about 10/1000 inches to about 20/1000 inches.

40. The drop generator of claim 14 wherein the first non-circular outlet channel section has an effective diameter of about 15/1000 inches to about 17/1000 inches.

41. The drop generator of claim 14 wherein the second non-circular outlet channel section has an effective diameter of about 8/1000 inches to about 16/1000 inches.

42. The drop generator of claim 14 wherein the second non-circular outlet channel section has an effective diameter of about 13/1000 inches to about 16/1000 inches.

43. A drop generator comprising:  
a pressure chamber;  
an inlet channel connected to the pressure chamber;  
an outlet channel connected to the pressure chamber, the outlet channel having an outlet channel axis;

the outlet channel including a first circular outlet channel section connected to the pressure chamber, a first non-circular outlet channel section connected to the first circular outlet channel section, a second circular outlet channel section connected to the first non-circular outlet channel section, and a second non-circular outlet channel section connected to the second circular outlet section;

wherein the first circular outlet channel section, the first non-circular outlet channel section, and the second circular outlet channel section are substantially centered on the outlet channel axis; and

a nozzle disposed at an end of the second non-circular outlet channel section and offset from the outlet channel axis.

44. The drop generator of claim 43 wherein the second non-circular outlet channel section non-circular section has a generally egg-shaped cross-section.

45. The drop generator of claim 43 wherein the first circular outlet channel section includes a plurality of circular sub-sections.

46. The drop generator of claim 43 wherein the second circular outlet channel section includes a plurality of circular sub-sections.

47. The drop generator of claim 43 wherein the ink pressure chamber has a cross-section that is generally parallelogram shaped.

48. The drop generator of claim 43 wherein the nozzle emits drops having a mass in the range of about 20 nanograms to about 30 nanograms.

49. The drop generator of claim 43 wherein the pressure chamber is operated at a frequency of about 23 KHz to about 30 KHz.